

Analysis and Applied Mathematics Seminar

Numerical Optimal Transportation Using the Monge-Ampere Equation

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Abstract: The problem of optimal transportation, which involves finding the most cost-efficient mapping between two measures, arises in many different applications. However, the numerical solution of this problem remains extremely challenging. We describe a numerical method for the widely-studied case when the cost is quadratic. The solution is obtained by solving the Monge-Ampere equation, a fully nonlinear elliptic partial differential equation (PDE), coupled to a non-standard implicit boundary condition. Expressing this problem in terms of weak (viscosity) solutions enables us to construct a monotone finite difference approximation that computes the correct solution. A range of challenging computational examples demonstrate the effectiveness of this method, including the recent application of this method to problems in beam shaping and seismic inversion.

Monday, February 8 at 4:00 PM in SEO 636